Appendix Item 1

Traffic Analysis
Corridor Study
North-South Expressway
I-220 to Arkansas State Line

Appendix A
Appendix B

Traffic Analysis

North-South Expressway Corridor Study
I.H. 220 in Shreveport to Arkansas State Line

State Project No. 700-24-0072

prepared for

Demopulos and Ferguson

Consulting Engineers

prepared by

Wilbur Smith Associates

Consulting Engineers and Planners

October 25, 1995

WILBUR
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October 25, 1995

Mr. Chris Demopulos, P.E.
President
Demopulos & Ferguson, Inc.
401 Edwards, Suite 1600
Shreveport, Louisiana 71101-6141

Dear Mr. Demopulos:

We are pleased to submit this final report, which documents the findings of our Traffic Analysis conducted for the North-South Expressway Corridor Study. This traffic analysis was performed in accordance with our Subconsultant Agreement with Demopulos & Ferguson, dated April 4, 1994.

This report documents the analysis of existing traffic, roadway and land use conditions in the study corridor; estimates future (years 2005 and 2020) traffic volumes on alternative highway alignments; and, reports the traffic impacts associated with the proposed North-South Expressway between Interstate 220 in Shreveport and the Arkansas State Line.

We appreciate the opportunity to undertake this traffic analysis for the North-South Expressway Corridor Study. Should you have any questions regarding our findings, please advise us.

Respectfully submitted,

WILBUR SMITH ASSOCIATES

Robert P. Babineaux, Jr.

Robert P. Babineaux, Jr., P.E.
Project Manager

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Chapter 1
Introduction

This report documents an analysis of existing and future traffic conditions within the corridor of the proposed North-South Expressway between Interstate 220 in Shreveport, Louisiana and the Arkansas State Line. This traffic analysis was conducted by Wilbur Smith Associates as part of the North-South Expressway Corridor Study, which was undertaken for the Louisiana Department of Transportation and Development (LaDOTD). Professional engineering and planning services for the corridor study were provided by the Consultant Team of Demopulos and Ferguson in professional association with Wilbur Smith Associates and Geo-Marine.

Study Background

Interstate 49 extends in a north-south direction from Interstate 10 in Lafayette, Louisiana, to Interstate 20 in Shreveport, Louisiana. The proposed North-South Expressway, which would function as an extension of Interstate 49, has long been discussed between Shreveport and Kansas City, Missouri. Construction of the proposed highway would result in a continuous north-south freeway route through the central United States between the Gulf of Mexico and Canada (via Interstate 49 in Louisiana; the proposed highway between Shreveport and Kansas City; and, Interstates 29 and 35 between Kansas City and Canada).

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) calls for the development of "High Priority Corridors" on the National Highway System (NHS). ISTEA states that the development of these designated transportation corridors is the most efficient and effective way of integrating regions; improving efficiency, and safety of commerce and travel; and, further promoting economic development.

The proposed North-South Expressway between Shreveport and Kansas City is a designated High Priority Corridor project. ISTEA provides LaDOTD with approximately $29 million for the planning, design and partial construction of the North-South Expressway between Shreveport and the Arkansas State Line. ISTEA funding is also provided for the sections of this new highway facility within the States of Arkansas and Missouri, which are currently in various stages of planning and design.

Study Purpose

The purpose of this traffic analysis element of the North-South Expressway Corridor Study is to evaluate the traffic impacts of the proposed highway between Interstate 220 in Shreveport and the Arkansas State Line. This traffic study analyzes existing traffic, roadway and land use conditions in the study corridor; estimates future (years 2005 and 2020) traffic volumes on alternative highway alignments; and, evaluates the traffic impacts associated with the proposed North-South Expressway on the area transportation system.

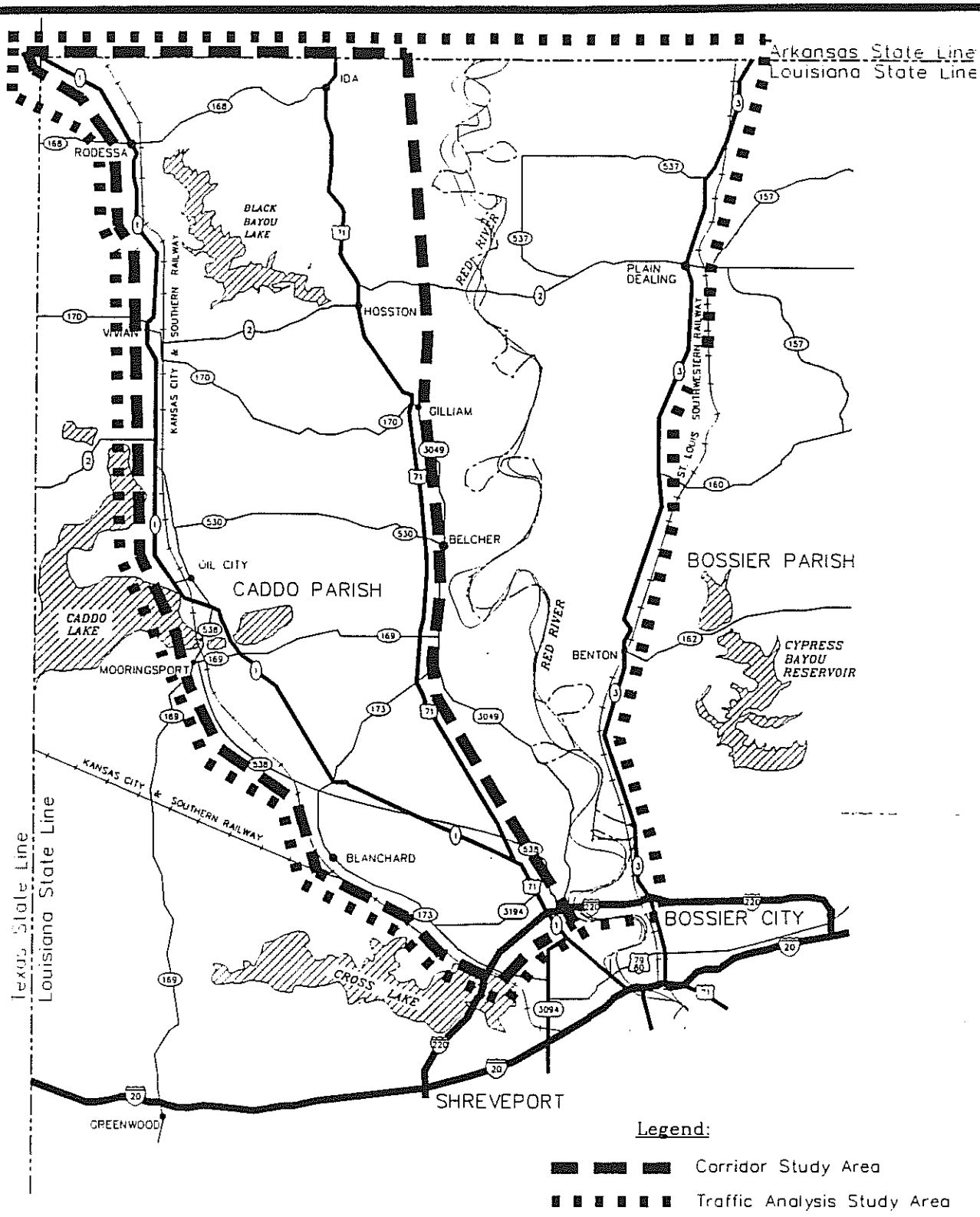
Study Area

The study area selected for the North-South Expressway Corridor Study, shown in **Figure 1**, is located in north Caddo Parish in northwest Louisiana. It is generally bounded by the Arkansas State Line on the north, US 71 on the east, Interstate 220 on the south, and LA 1/LA 173 on the west. The study corridor is approximately 48 kilometers (30 miles) in length and has an average width of approximately 10 kilometers (six miles). For this traffic analysis, the corridor study area as well as the area located further east across the Red River to LA 3 was considered, recognizing the likelihood that some of the through traffic currently utilizing LA 3 will divert to the proposed North-South Expressway.

Study Coordination and Development

This traffic study was conducted in close coordination with staff of the Design and Planning Divisions of LaDOTD. A Technical Advisory Committee was also established for the study, which served in a technical advisory role and provided input and review of study elements. The Technical Advisory Committee includes the following members:

- Mr. Richard Savoie, P.E., Project Coordinator, LaDOTD;
- Mr. Bruce Easterly, P.E., District Administrator, LaDOTD;
- Mr. Tom Dark, Director of Public Works, City of Shreveport;
- Mr. Gary Neathery, Director of Public Works, Caddo Parish;
- Mr. Andrew Kohl, P.E., Parish Engineer, Caddo Parish;
- Mr. Charles Kirkland, Director, Metropolitan Planning Commission; and,
- Mr. Kent Rogers, Executive Director, Northwest Louisiana Council of Governments.



Study Area

North-South Expressway Corridor Study

Shreveport to Arkansas State Line

3 2 1 0 3M

SCALE IN MILES

Wilbur Smith Associates

Figure 1

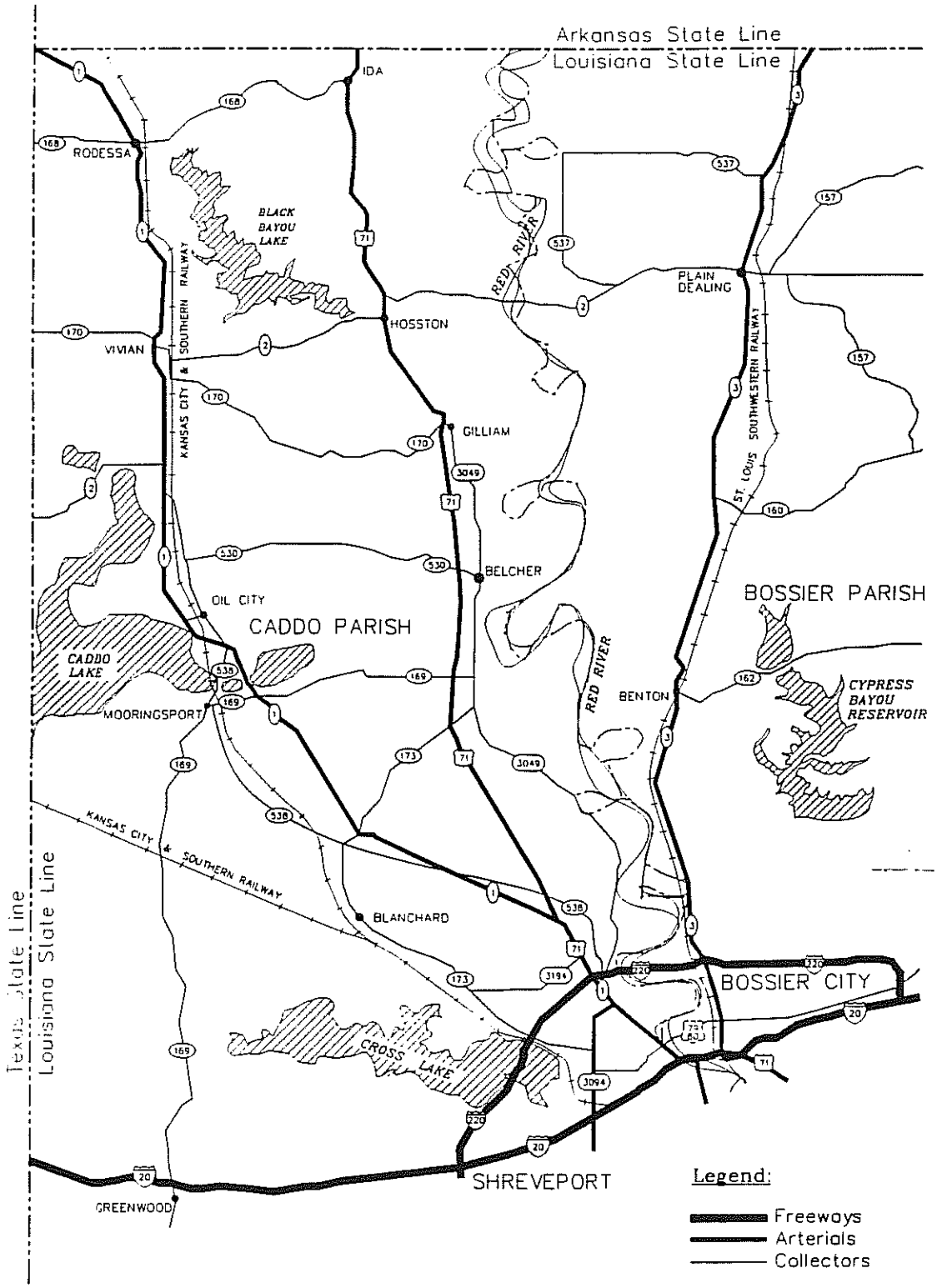
Additionally, meetings were held with area public agencies, elected officials and organizations to obtain available information regarding existing and planned roadway, traffic and land use conditions and to discuss highway improvement needs. LaDOTD and Consultant Team staff also met with the Arkansas State Highway and Transportation Department (ASHTD) for coordination purposes and to discuss the status and findings of their study efforts regarding alternative highway alignments within the State of Arkansas.

Finally, a total of four public meetings were held during the project to provide citizens with an opportunity to state their comments, concerns and suggestions regarding study findings and alternative highway alignments. Two meetings, one in Gilliam and the other in North Shreveport, were conducted near the beginning of the study on August 22 and 23, 1994, respectively. Additional public meetings were held in Hosston and North Shreveport near the end of the project on June 27 and 28, 1995, to present the study findings regarding alternative alignments of the proposed North-South Expressway.

Available Data and Previous Studies

This study made maximum use of available data and previous studies obtained from area agencies and organizations. Special consideration was given to the findings included in the following previous studies:

- Shreveport - Bossier Metropolitan Area Transportation Plan (1990 - 2010), Wilbur Smith Associates in association with Demopulos and Ferguson, November 1989;
- Kansas City, Missouri to Shreveport, Louisiana Highway Feasibility Study, Arkansas State Highway and Transportation Department, April 1988;
- U.S. Highway 71 Draft Environmental Impact Statement - Texarkana, Arkansas to Louisiana State Line, Arkansas State Highway and Transportation Department, 1994.
- U.S. 71 Alternatives Study, Carter Burgess, May 1994; and,
- North-South Expressway Corridor Location Study, HNTB, 1973.
- Population Projections to 2010 of Louisiana Parishes, Michael D. Irwin, Louisiana State University, 1992.



Existing Roadway Classification

North-South Expressway Corridor Study

Shreveport to Arkansas State Line

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SCALE IN MILES

Wilbur Smith Associates

Figure 2

Study area roadways are classified as either freeways, arterials or collector streets depending on their characteristics, function and usage. Freeways have full control of access, with grade separations at all intersections. They provide for movement of large volumes of traffic at relatively high speeds, and are primarily intended to serve long trips. Arterials, which are commonly referred to as major thoroughfares, serve as feeders to freeways (and expressways) and are principal travelways between major land use concentrations. Arterials accommodate relatively long through trips, as well as local trips. Collector streets provide both land service and traffic movement functions, serve as intermediate feeders to arterials, and primarily accommodate short distance trips.

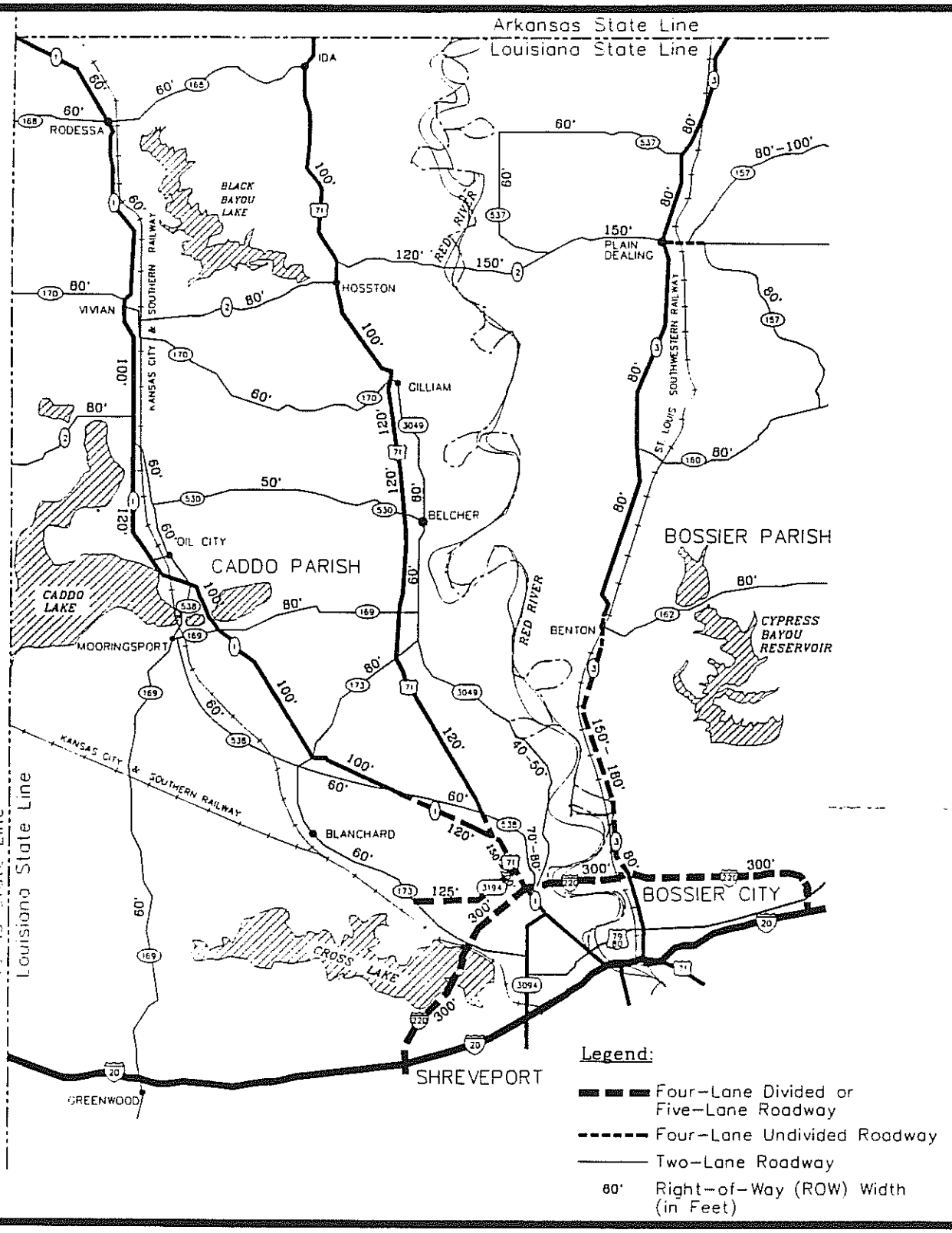
Interstate 220 forms the southern boundary of the study area and is the only freeway facility serving the study corridor. Arterials include the north-south highways of U.S. 71, LA 1 and LA 3. There are no east - west arterials serving the study area. The remaining study area streets are collectors.

The proposed North-South Expressway between Shreveport and Kansas City, Missouri is planned to be a freeway or interstate type facility. There are no north-south freeways located within or near the corridor study area. Interstate 35 in Texas and Interstate 55 in Mississippi are the closest north - south freeways in the west and east, respectively. The distance between these two interstates is approximately 800 kilometers (500 miles).

Existing Roadway and Right-of-Way Conditions

The existing number of travel lanes and right-of-way (ROW) widths on area roadways are shown in **Figure 3**. Most of the roadways are two-lane facilities, except for the following four or five-lane roadways:

- Interstate 220;
- U.S. 71 and LA 1 - Between Interstate 220 and LA 538;
- LA 3194 - Between LA 173 and U.S. 71/LA 1;
- LA 3 - Between Interstate 220 and LA 162; and,
- LA 2 - Between LA 3 and LA 157.



Roadway Travel Lanes and Right-of-Way Widths

North-South Expressway Corridor Study

Shreveport to Arkansas State Line

SCALE IN MILES

Wilbur Smith Associates

Figure 3

The typical ROW width on Interstate 220 is 90 meters (300 feet). ROW widths on arterials range from 18 to 37 meters (60 to 120 feet) on LA 1; 30 to 60 meters (100 to 200 feet) on U.S. 71; and, 24 to 55 meters (80 to 180 feet) on LA 3. Collector streets have ROW widths generally ranging from 18 to 24 meters (60 to 80 feet).

Existing Traffic Volumes

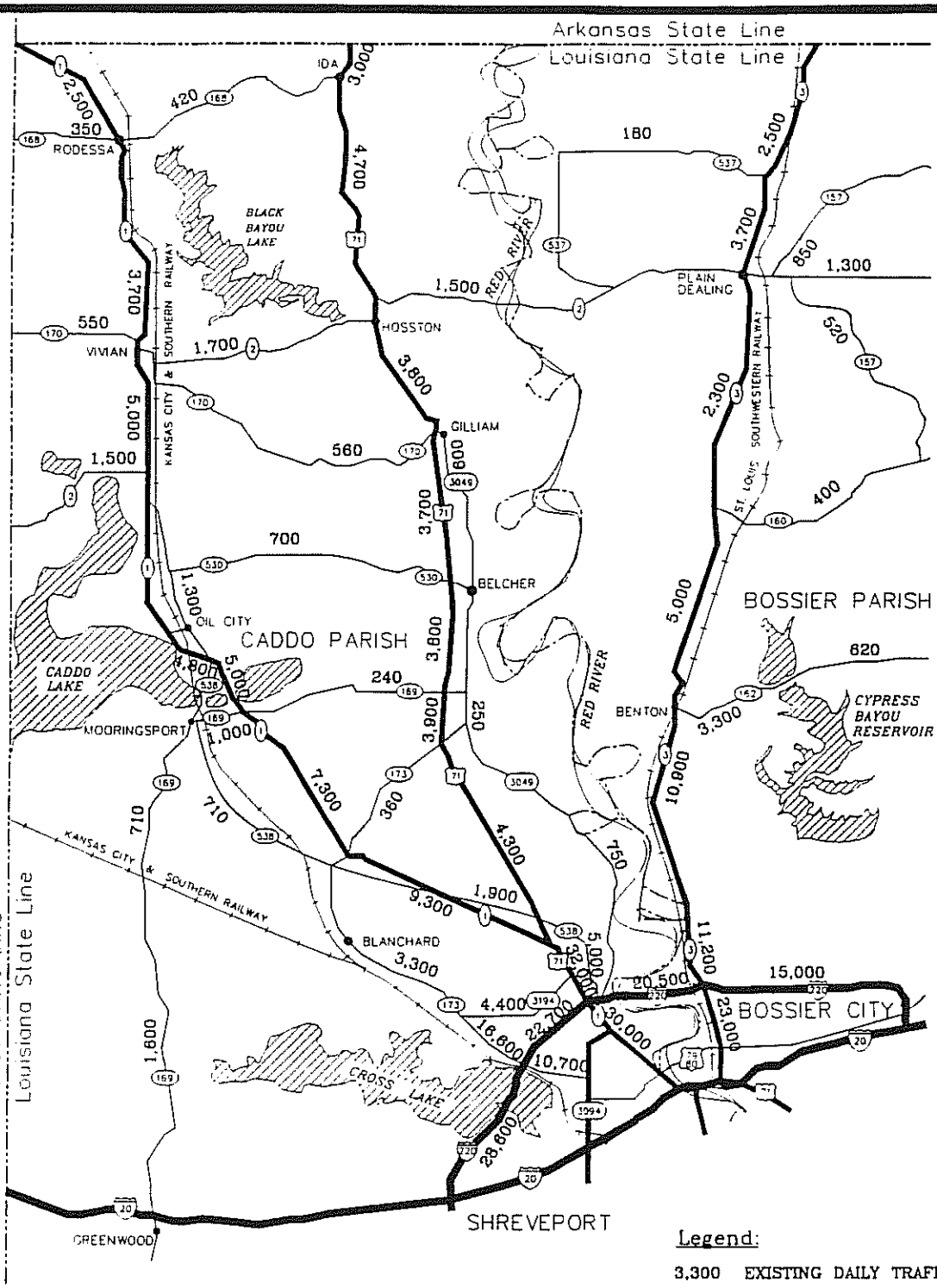
Existing daily traffic volumes on study area highways during a typical weekday are shown in **Figure 4**. These daily traffic volumes were obtained from the following sources: 48-hour vehicle classification counts conducted at 20 locations for this study during June 1994; and, available 1993 traffic volumes conducted by LaDOTD. Detailed summaries of the 48-hour traffic volume counts conducted for this study are provided in **Appendix A**.

Interstate 220 carries approximately 22,700 vehicles per day (vpd) adjacent to the corridor study area, west of U.S. 71. Traffic volumes on the north - south arterials of U.S. 71, LA 1, and LA 3 are highest at Interstate 220 and experience consistent decreases in traffic volumes as they continue to the north toward the Arkansas State Line. For example, traffic volumes on LA 1 and U.S. 71 range from 2,500 and 3,000 vpd at the Arkansas State Line, respectively, to 32,000 vpd on U.S. 71/LA 1 just north of Interstate 220. Likewise, traffic volumes on LA 3 range from 2,500 vpd at the Arkansas State Line to 11,200 vpd north of Interstate 220. Daily traffic volumes on collector streets range from 180 vpd on LA 537 to 16,600 vpd on LA 173.

Existing Travel Characteristics

Travel surveys were conducted along north - south arterials in the area to determine existing travel characteristics and patterns. Information obtained from the travel surveys was also used for developing travel demand models that were employed for estimating future traffic volumes on the proposed North - South Expressway and study area roadway network. Travel surveys were conducted at the following locations:

- LA 1 - North of LA 173
- U.S. 71 - South of LA 173
- LA 3 - North of LA 537



SOURCE: 1993 traffic counts by LaDOTD and 1994 traffic counts conducted for this study

Existing Daily Traffic Volumes

North-South Expressway Corridor Study

Shreveport to Arkansas State Line

3 2 1 0 3M

SCALE IN MILES

Wilbur Smith Associates

Figure 4

Travel surveys were conducted in the northbound direction on typical weekdays (June 7 - 9, 1994) between the hours of 7:00 a.m. and 7:00 p.m. These travel surveys, which involved directly interviewing motorists, obtained information regarding trip origin and destination; trip purpose; time of travel; vehicle classification; vehicle occupancy; state in which vehicle was registered; and, whether or not the motorist used Interstate 220 in Shreveport on their trip. A copy of the travel survey form is provided in **Appendix B**.

The 48 - hour mechanical and 12-hour manual vehicle classification counts were conducted in both directions at each survey location using FHWA vehicle classification categories. These traffic counts were used for expansion of the completed survey information to account for the total traffic at the survey stations for travel demand modeling purposes. Vehicle classifications categories and results of the 12- hour manual vehicle classification counts conducted at the survey locations are provided in Appendix B.

Survey Sample- During the 12-hour survey period, 2,974 surveys were completed at all three locations, which represents approximately 57 percent of the total 5,200 vehicles travelling in the northbound direction. A summary of percent traffic surveyed at each survey location is shown in **Table 1**.

Table 1

TRAVEL SURVEY RESULTS
North - South Expressway Corridor Study
Shreveport to Arkansas State Line

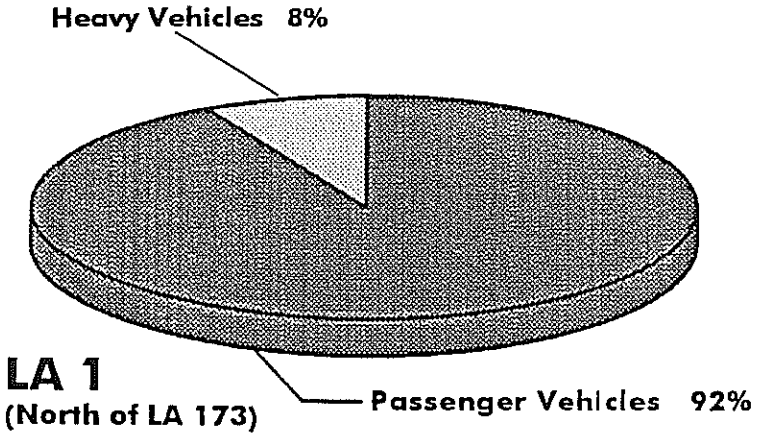
Survey Location	Daily Traffic Volumes	Survey Period Traffic Volumes (7:00 a.m. - 7:00 p.m.) North Bound	South Bound	Total	Completed Surveys	Percent North bound Traffic Surveyed
LA 1 (North of LA 173)	7,300	2,660	2,410	5,070	1,073	40%
US 71 (South of LA 173)	4,400	1,670	1,430	3,100	1,240	74%
LA 3 (North of LA 537)	2,500	870	810	1,680	661	76%

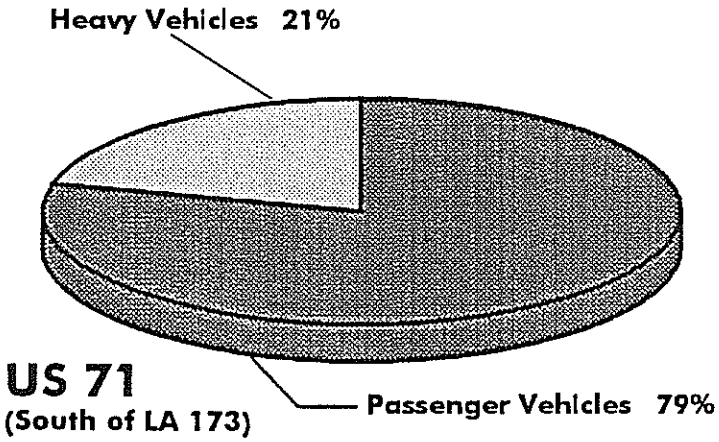
Vehicle Classification - Results of 12-hour vehicle classification counts conducted in both directions at each survey location are shown in **Figure 5**. This figure groups the detailed vehicle classification counts into two broad categories: passenger vehicles and heavy vehicles. Passenger vehicles include passenger cars, vans, pick-up trucks and motorcycles. Heavy vehicles include single unit trucks, tractor-trailer combinations (18-wheelers), and buses. The lowest percentage of heavy vehicles (8 percent) occurs on LA 1. The percentage of heavy vehicles on U.S. 71 and LA 3 are 21 percent and 34 percent, respectively.

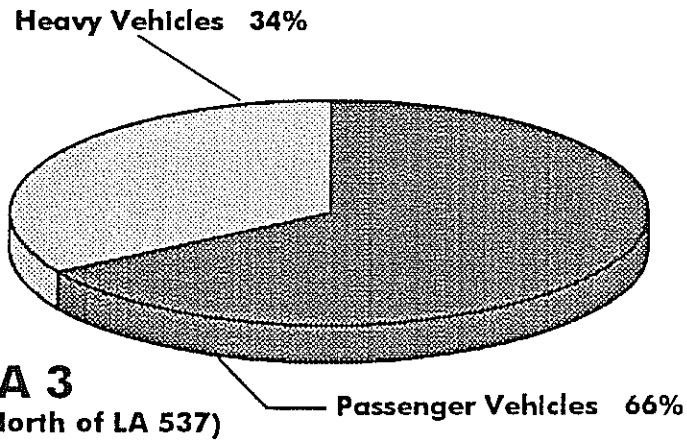
Through versus Local Trips - Vehicle trips are classified as either through or local trips. Through trips are trips that originate and end outside of the study area. Local trips originate and/or end within the study area. The distribution of through versus local trips at the survey locations are shown in **Figure 6**. LA 1 experiences the lowest percentage of through trips (nine percent), which indicates the high usage of this facility by local traffic. Both U.S. 71 and LA 3 are more highly used by through traffic, with 47 and 46 percent of the total traffic on these facilities being through trips, respectfully.

Trip Purpose - The purpose of trips at survey locations, shown in **Figure 7**, were classified as trips to/from work, business related, vacation/recreation, shopping, or other. The majority of the trips at survey locations were work and business related, which ranged from 64 percent on LA 3 to 78 percent on LA 1. The second highest trip purpose at all survey locations was vacation/recreation trips, which was 17 percent on LA 1, 27 percent on U.S. 71, and 30 percent on LA 3.

Trip Origins/Destinations - Trip origins/destinations by State are shown in **Figure 8**. A majority of the trips at survey locations either originated or ended in Louisiana. The percentage of Louisiana trips were 49 percent of LA 3, 67 percent on U.S. 71, and 88 percent on LA 1. Trips originating or destined to Texas were about the same on all highways: seven percent on LA 3; eight percent on U.S. 71; and nine percent on LA 1. LA 3 experienced the highest percentage of trips originating or destined to Arkansas, with 25 percent. The percentage of Arkansas trips on U.S. 71 was nine percent, with only one percent of the traffic on LA 1 originating or destined to Arkansas.







Note:

Passenger Vehicles include passenger cars, pick-up trucks, vans and motorcyles. Heavy Vehicles include single unit trucks, tractor-trailer combinations, and buses.

Source: Travel surveys conducted by Wilbur Smith Associates during June 1994.

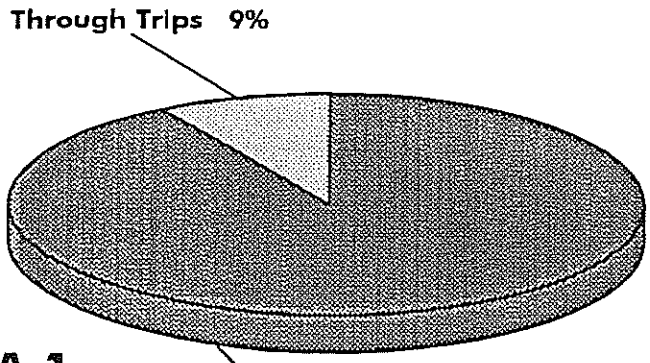
Vehicle Classifications At Survey Locations

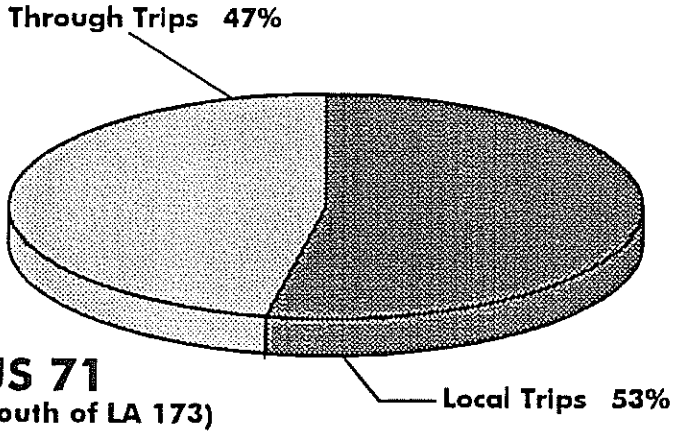
North-South Expressway Corridor Study

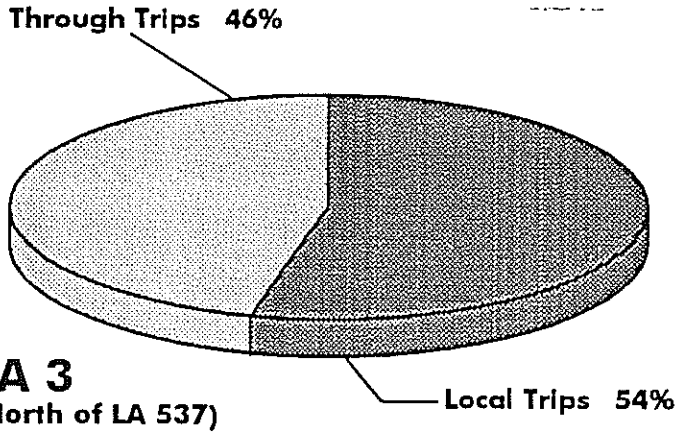
Shreveport to Arkansas State Line

Wilbur Smith Associates

Figure 5







Note:

Local trips include trips originating and/or ending inside study area.
Through trips include trips originating and ending outside study area.

Source: Travel surveys conducted by Wilbur Smith Associates during June 1994.

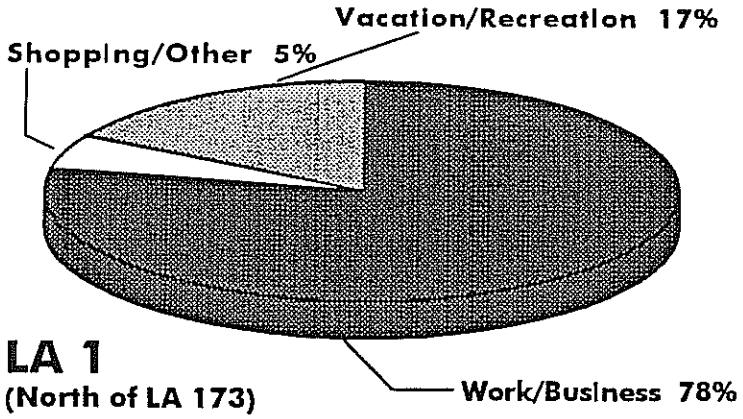
Local vs. Through Trips At Survey Locations

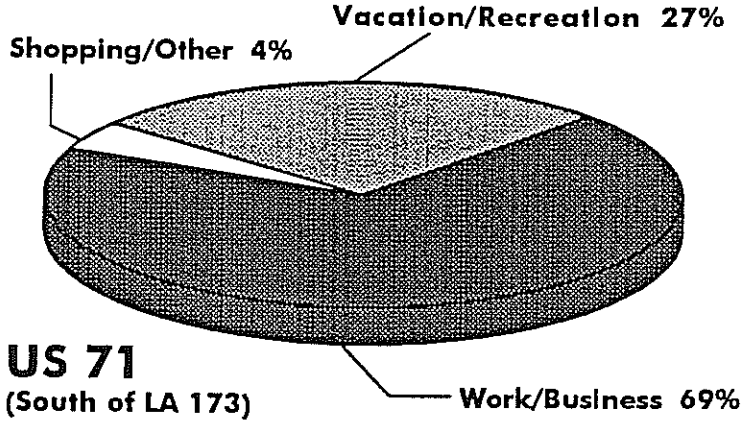
North-South Expressway Corridor Study

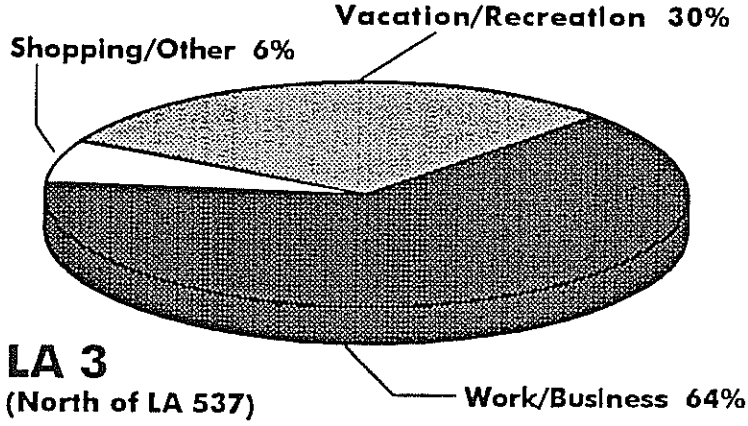
Shreveport to Arkansas State Line

Wilbur Smith Associates

Figure 6







Source: Travel surveys conducted by Wilbur Smith Associates during June 1994.

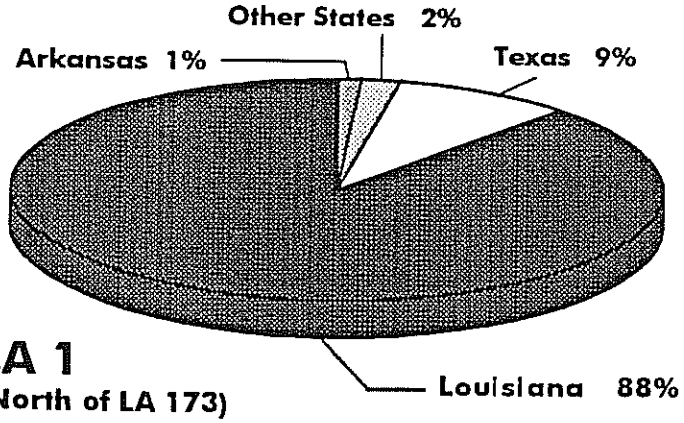
Purpose of Trips At Survey Locations

North-South Expressway Corridor Study

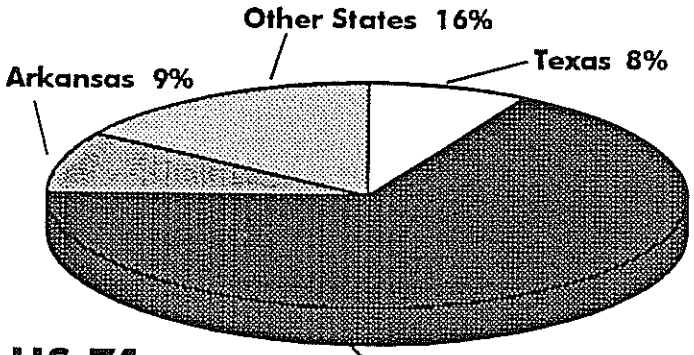
Shreveport to Arkansas State Line

Wilbur Smith Associates

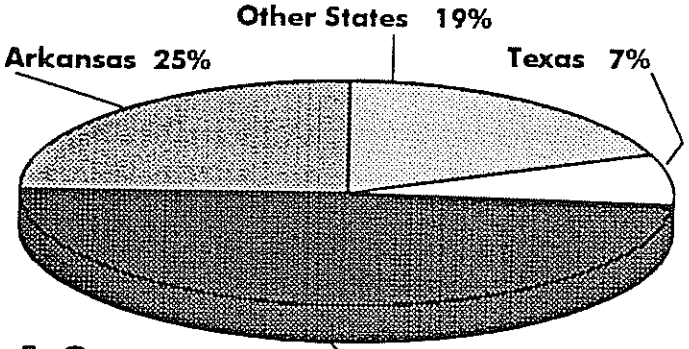
Figure 7



LA 1
(North of LA 173)



US 71
(South of LA 173)



LA 3
(North of LA 573)

Source: Travel surveys conducted by Wilbur Smith Associates during June 1994.

Origins/Destinations At Survey Locations

North-South Expressway Corridor Study

Shreveport to Arkansas State Line

Wilbur Smith Associates

Figure 8

Existing Traffic Operations

Existing traffic operations on area roadways were evaluated based on field investigations and capacity analyses. The principal determinant of roadway capacity in rural areas is the number and width of travel lanes. Other factors, such as design speed, traffic composition, traffic and access controls, and adjacent development also influence the ability of a roadway to accommodate traffic. Generalized daily roadway capacities of study area highways are estimated to be 12,000 vehicles per day (vpd) for two-lane highways, 28,000 vpd for four-lane highways, and 68,000 vpd for four-lane freeways. These estimated capacities, which are based on the methodology of the 1985 Highway Capacity Manual (HCM) and existing traffic and roadway characteristics in the study area, were used in evaluating existing and future traffic operations.

An important element of a capacity analysis is the determination of the level-of-service (LOS) provided on a roadway, which is a qualitative measure of traffic operations. LOS is given a letter designation from A to F, with LOS A representing free-flow conditions and LOS F representing heavy congestion or traffic breakdown conditions. LOS C is considered the acceptable limit of traffic operations in rural areas, with LOS D the limit of acceptable operations in urbans areas. LOS E and F represents unacceptable traffic conditions and congestion. Descriptions of the various LOS designations along with their corresponding traffic volume/roadway capacity (v/c) ratios are provided in **Table 2**.

Most of the study area roadways currently operate at LOS A or B during peak periods. Highways operating at LOS C include: LA 1 between LA 170 and LA 169; LA 173 between LA 538 and Interstate 220; U.S. 71 between the Arkansas State Line and LA 538; LA 3 between LA 160 and LA 162; and, LA 538 between U.S. 71 and Interstate 220. LA 1 between LA 169 and LA 538 operates at LOS D. U.S. 71/LA 1 between LA 3194 and Interstate 220 is the only study area highway currently operating at unacceptable LOS E.

Table 2

LEVEL-OF-SERVICE (LOS) DEFINITIONS IN PRIMARILY RURAL AREAS
North-South Expressway Corridor Study
Shreveport to Arkansas State Line

Level of Service (LOS)	Estimated Maximum Volume/Capacity (V/C) Ratios			Description
	Two-Lane Highway	Multi-Lane Highway	Freeway	
A	0.10	0.35	0.35	highest quality of traffic service; free-flow conditions; motorists drive at desired speed; minor traffic flow disruptions.
B	0.25	0.50	0.50	good quality of traffic service; reasonable flow conditions; noticeable presence of other vehicles; ability to maneuver slightly restricted.
C	0.40	0.65	0.70	stable traffic flow; noticeable increases in platoon formation; ability to maneuver noticeably restricted; minor disruptions could cause traffic service deterioration.
D	0.60	0.80	0.85	approaching unstable traffic flow; speed and ability to maneuver severely restricted; limit of acceptable operations.
E	1.0	1.0	1.0	unstable traffic flow; travel demand approaching or at roadway capacity.
F	>1.0	>1.0	>1.0	heavy congested flow; traffic demand exceeds roadway capacity; forced or breakdown traffic flow

Source: Highway Capacity Manual, Transportation Research Board, 1985.